Listing of Claims

The following listing of claims replaces all prior versions and listings of claims in the application.

Claims 1-14 (canceled)

Claim 15 (original): An optical demultiplexer comprising:

a plurality of drop devices, each of the drop devices having a control light input port to which a control light is applied, an optical signal input port to which an optical signal is applied, and a drop signal output port from which the optical signal is delivered in synchronous with inputting of the control light;

a signal waveguide for branching a time-division multiplexed optical signal and introducing a plurality of branched optical signals respectively to the optical signal input ports of the drop devices; and

a control waveguide for branching one control light and introducing a plurality of branched control lights to reach the corresponding drop devices at delays gradually shifted in units of a certain time.

Claim 16 (original): An optical demultiplexer comprising:

a number N (N is two or larger integer) of drop devices, each of the drop devices having a control light input port to which a control light is applied, an optical signal input port to which an optical signal is applied, and a drop signal output port from which the optical signal is delivered in synchronous with inputting of the control light;

a signal waveguide for introducing an optical signal, which is time-division multiplexed at multiplicity of N and has a number N of channels, to the optical signal input port of each of the drop devices; and

a control waveguide for branching one control light into a number N of control lights and introducing an i-th (i is an integer not smaller than 1 but not larger than N) one of the branched control lights to the control light input port of an i-th drop device,

the signal waveguide and the control waveguide delaying one of the control light and the optical signal relative to the other such that the control light applied to the i-th drop device is in synchronous with an i-th channel of the optical signal applied to the i-th drop device.

Claim 17 (original): An optical demultiplexer comprising:

a number N (N is two or larger integer) of drop devices arranged from a first stage to an N-th stage, each of the drop devices having a control light input port to which a control light is applied, an optical signal input port to which an optical signal is applied, a drop signal output port from which the optical signal is delivered in synchronous with inputting of the control light, and a through signal output port from which the optical signal is delivered at least during a period in which the optical signal is not delivered from the drop signal output port;

a first signal waveguide for introducing a time-division multiplexed optical signal to the optical signal input port of the first-stage drop device;

a second signal waveguide for connecting the through signal output port of each drop device to the optical signal input port of the drop device in a next stage; and

a control waveguide for branching one control light and introducing a plurality of branched control lights to reach the corresponding drop devices at delays gradually shifted in units of a

certain time toward a most downstream stage.

Claim 18 (original): An optical demultiplexer according to claim 17, wherein the optical signal is a signal having a number N of time-division multiplexed channels, and

wherein the control waveguide delays the control light inputted to an i-th (i is an integer not smaller than 1 but not larger than N) drop device to be in synchronous with an i-th channel of the optical signal inputted to the i-th drop device.

Claim 19 (original): An optical demultiplexer according to claim 15, wherein each of the drop devices is constituted by an optical switch, the optical switch comprising:

a first multimode interferometer having a first input port to which an optical signal is applied, and at least two output ports;

a first optical waveguide connected to one or each of plural first output ports, which is or are selected from the output ports, and allowing a light exiting from the one or plural first output ports to propagate therethrough, the first optical waveguide having a refractive index changed in response to a trigger signal externally applied;

a second optical waveguide connected to one or each of plural second output ports, which is or are selected from the output ports, and allowing a light exiting from the one or plural second output ports to propagate therethrough; and

trigger for supplying, to the first optical waveguide, the trigger signal for changing the refractive index of the first optical waveguide, and

wherein the first multimode interferometer has a second input port other than the first input port, and

wherein the trigger comprises:

a third multimode interferometer having a first input port to which a control light is applied, a first output port, and a second output port;

a third optical waveguide for introducing a light having exited from the second output port of the third multimode interferometer to the second input port of the first multimode interferometer; and

a combining optical element for combining a light having exited from the first output port of the third multimode interferometer with the optical signal, and introducing a combined light to the first input port of the first multimode interferometer.

Claim 20 (original): An optical demultiplexer according to claim 16, wherein each of the drop devices is constituted by an optical switch, the optical switch comprising:

a first multimode interferometer having a first input port to which an optical signal is applied, and at least two output ports;

a first optical waveguide connected to one or each of plural first output ports, which is or are selected from the output ports, and allowing a light exiting from the one or plural first output ports to propagate therethrough, the first optical waveguide having a refractive index changed in response to a trigger signal externally applied;

a second optical waveguide connected to one or each of plural second output ports, which is or are selected from the output ports, and allowing a light exiting from the one or plural second output ports to propagate therethrough; and

trigger for supplying, to the first optical waveguide, the trigger signal for changing the refractive index of the first optical waveguide, and

wherein the first multimode interferometer has a second input port other than the first input port, and

wherein the trigger comprises:

a third multimode interferometer having a first input port to which a control light is applied, a first output port, and a second output port;

a third optical waveguide for introducing a light having exited from the second output port of the third multimode interferometer to the second input port of the first multimode interferometer; and

a combining optical element for combining a light having exited from the first output port of the third multimode interferometer with the optical signal, and introducing a combined light to the first input port of the first multimode interferometer.

Claim 21 (original): An optical demultiplexer according to claim 17, wherein each of the drop devices is constituted by an optical switch, the optical switch comprising:

a first multimode interferometer having a first input port to which an optical signal is applied, and at least two output ports;

a first optical waveguide connected to one or each of plural first output ports, which is or are selected from the output ports, and allowing a light exiting from the one or plural first output ports to propagate therethrough, the first optical waveguide having a refractive index changed in response to a trigger signal externally applied;

a second optical waveguide connected to one or each of plural second output ports, which is or are selected from the output ports, and allowing a light exiting from the one or plural second output ports to propagate therethrough; and

trigger for supplying, to the first optical waveguide, the trigger signal for changing the refractive index of the first optical waveguide, and

wherein the first multimode interferometer has a second input port other than the first input port, and

wherein the trigger comprises:

a third multimode interferometer having a first input port to which a control light is applied, a first output port, and a second output port;

a third optical waveguide for introducing a light having exited from the second output port of the third multimode interferometer to the second input port of the first multimode interferometer; and

a combining optical element for combining a light having exited from the first output port of the third multimode interferometer with the optical signal, and introducing a combined light to the first input port of the first multimode interferometer.

Claim 22 (original): An optical demultiplexer according to claim 15, further comprising a transducer for converting the optical signal delivered from the drop signal output port of each of said drop devices into an electrical signal.

Claim 23 (original): An optical demultiplexer according to claim 16, further comprising a transducer for converting the optical signal delivered from the drop signal output port of each of said drop devices into an electrical signal.

Claim 24 (original): An optical demultiplexer according to Claim 17, further comprising a transducer for converting the optical signal delivered from the drop signal output port of each of said drop devices into an electrical signal.